

## **REMARKS**

### **A.      Status of Claims**

Favorable reconsideration of this application as presently amended is respectfully requested. Claims 1 through 49 are pending of which Claims 1 through 18 and 36 through 49 are currently under consideration. Claims 1, 3, 5, 7, 8, 10-11, 13 and 14 are amended, Claims 36 through 49 have been added, and Claims 19 through 35 have been withdrawn from consideration as being drawn to a non-elected species.<sup>1</sup> Support for new claims 36 through 42 may be found, *inter alia*, on page 8. Support for new claims 43 and 44 may be found, *inter alia*, on page 9. Support for new claims 45 and 46 may be found, *inter alia*, on page 4. Support for new claims 47 through 49 may be found, *inter alia*, on page 6. No new matter has been added by the addition of Claims 36 through 49.

### **B.      Procedural Matters**

Applicants note, with thanks, the Examiner's acknowledgment of the acceptance of the drawings filed on June 2, 2006.

Applicants note, with thanks, the Examiner's acknowledgment of the acceptance of receipt of papers submitted under 35 U.S.C. § 119.

Applicants further note the Examiner's acknowledgment of the acceptance of the response filed on February 19, 2008 where Applicants elected Group I, drawn to pending Claims 1-18.<sup>2</sup>

Applicants also note, with thanks, the Examiner's acknowledgment of the acceptance of the Information Disclosure Statement filed on June 2, 2006.

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<sup>1</sup> See Section B below.

<sup>2</sup> See Office Action, Section 1, p. 2.

C. **Claims 5 and 13-16 are in Condition for Allowance**

Applicants wish to thank the Examiner for indicating in Section 8 of the Office Action that Claims 5 and 13-16 claim allowable subject matter.<sup>3</sup> As suggested by the Examiner, Claims 5, 13 and 14 have been rewritten in independent form to include all of the limitations of the base claim and intervening claims, and, therefore, are now in condition for allowance. Claims 15 and 16 are dependent on allowable Claim 14, and, therefore, are also in condition for allowance.

D. **Response to Rejection of Claims 1, 2, 6, 10, 12, 17 and 18, Under 35 U.S.C. § 102(b) as Being Anticipated by Katada**

The Office Action rejects Claims 1, 2, 6, 10, 12, 17 and 18, under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,383,993 to Katada *et al.* (Hereinafter “Katada”).<sup>4</sup> This rejection has been obviated by the above amendments to the claims.

Claim 1, as currently presented, claims “performing anodic bonding of objects to be bonded after subjecting bonding surfaces of both the objects to be bonded to a surface activation treatment using an atom beam or an ion beam” (emphasis added). Katada does not teach or suggest subjecting the bonding surfaces of two objects with a surface activation using an atom beam or an ion beam. Katada does not teach or suggest all of the features of Claim 1 as currently presented. Therefore, Claim 1 is patentable over Katada for at least this reason.

Claims 2, 6, 17 and 18 are dependent on independent Claim 1, and, therefore, are patentable over Katada for at least the same reasons that Claim 1 is patentable over Katada.

Claims 10 and 12 have been amended to dependent, either directly or indirectly, on Claim 3 and are patentable over Katada for at least the reasons that Claim 3 is patentable over Katada. Claim 3 as currently presented claims the feature that “after said surface activation treatment, the anodic bonding of both the objects to be bonded is performed without exposure to the atmospheric air.” Katada does not teach or suggest subjecting this feature of Claim 3. Therefore, Katada does not teach or suggest all of the features of Claims 3, 10 and 12.

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<sup>3</sup> See Office Action, p. 6.

<sup>4</sup> See Office Action, pp. 2-3.

For at least the above reasons, the rejection of Claims 1, 2, 6, 10, 12, 17 and 18, Under 35 U.S.C. § 102(b) as being anticipated by Katada should be withdrawn.

E. **Response to Rejection of Claims 1, 2, 6-8, 10, 12, 17 and 18 Under 35 U.S.C. § 102(e) as Being Unpatentable over Yang**

The Office Action rejects Claims 1, 2, 6-8, 10, 12, 17 and 18 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 2005/0101059 to Yang. (Hereinafter “Yang”).<sup>5</sup> This rejection is respectfully traversed with respect to the claims as currently presented.

1. **The Rejection of Claims 1, 2, 6-8, 10, 12, 17 and 18 Under 35 U.S.C. § 102(e) over Yang is based on a Mischaracterization of Yang**

The rejection of Claims 1, 2, 6-8, 10, 12, 17 and 18 under 35 U.S.C. § 102(e) over Yang under relies on the following allegation:

***Allegation 1***

The prior art teaches the claimed invention in that it discloses a bonding method which comprises performing anodic bonding of object to be bonded after subjecting bonding surfaces of both the objects to be bonded to a surface activation treatment using an energy wave, such as an atom beam, an ion beam, or a plasma (see para. [0039] and claim 9). Note that Yang’s process includes a plasma activated bonding (corresponding to the claimed preliminary bonding) and an anodic bonding as disclosed in claim 9 [of Yang] (emphasis added).

Allegation 1 mischaracterizes what is described in paragraph [0039] and claim 9 of Yang, as can be seen by reviewing Paragraph [0039] and claim 9 of Yang provided below:

***Yang Paragraph [0039]***

[0039] Hermetic sealing of the transparent member to the substrate is performed according to several methods well known to those skilled in the art. For example, in an embodiment according to the present invention, hermetic

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<sup>5</sup> See Office Action, pp. 3-4.

**sealing is performed by plasma activated covalent wafer bonding** (PACWB).

PACWB is performed at room temperature after the substrate and transparent member have been cleaned, for example, in SCI (NH<sub>3</sub>:H<sub>2</sub>O:O<sub>2</sub>:H<sub>2</sub>O<sub>2</sub>, 1:4:20) at 60.degree. C., rinsed in de-ionized (DI) water, dipped in 2% HF for 20 seconds, rinsed in DI water and dried with N<sub>2</sub> or air. The substrate and transparent member are then exposed, for example, to an oxygen plasma in a reactive ion etcher at a chamber pressure of about 35 mTorr. In an alternative embodiment according to the present invention, the substrate and transparent member are exposed to an argon plasma. After plasma treatment, the surface of the silicon oxide is hydrophilic, promoting bonding. The substrate and the transparent member are brought into contact at room temperature in a preselected ambient environment. **In alternative embodiments according to the present invention, other bonding techniques are used, for example, eutectic low temperature bonding and anodic bonding** (emphasis added).

***Yang Claim 9***

9. The method of claim 1 wherein **the bonding process is selected from** at least a **plasma activated bonding**, eutectic bonding, glue layer **or** adhesive bonding, welding, **anodic bonding**, and fusion bonding (emphasis added).

Contrary to what is alleged in Allegation 1, paragraph [0039], and claim 9; Yang describe using **anodic bonding** and various other bonding techniques as an **alternative to the plasma activated bonding technique** described in paragraph [0039], **not as a bonding technique performed after a surface activation treatment**. Therefore, paragraph [0039] and claim 9 of Yang do not teach or suggest the feature of subjecting bonding surfaces of objects to be bonded to a **surface activation treatment using an energy wave “prior to performing anodic bonding of objects”** (emphasis added) as claimed by Claims 1, 2, 6-8, 10, 12, 17 and 18.<sup>6</sup> Also, nowhere else does Yang teach or suggest this feature of Claims 1, 2, 6-8, 10, 12, 17 and 18.

Because Yang does not teach all of the features of Claims 1, 2, 6-8, 10, 12, 17 and 18, Claims 1, 2, 6-8, 10, 12, 17 and 18 are patentable over Yang.

<sup>6</sup> As currently presented, Claims 1, 2, 6 and 17-18 claim a surface activation treatment using either an atom beam or an ion beam *i.e.* either of two types of energy waves.

2. Additional Reasons Claims 1, 2, 6-8, 10, 12, 17 and 18 are Patentable over Yang

In addition, with respect to Claim 1, as currently presented, claims “performing anodic bonding of objects to be bonded after subjecting bonding surfaces of both the objects to be bonded to a surface activation treatment using an atom beam or an ion beam” (emphasis added). Yang, *inter alia*, does not teach or suggest the highlighted feature, above. Therefore, Claim 1 is patentable over Yang for at least this reason.

Claims 2, 6, 17 and 18 are dependent on Claim 1, and, therefore, are patentable over Yang for at least the same reasons that Claim 1 is patentable over Yang.

Claims 10 and 12 have been amended to dependent, either directly or indirectly, on Claim 3 and are patentable over Yang for at least the reasons that Claim 3 is patentable over Yang. Claim 3 as currently presented claims the feature that “which comprises performing anodic bonding of objects to be bonded after subjecting bonding surfaces of both the objects to be bonded to a surface activation treatment using an energy wave, such as an atom beam, an ion beam, or a plasma.” Yang does not teach or suggest subjecting this feature of Claim 3. Therefore, Yang does not teach or suggest all of the features of Claims 3, 10 and 12.

Claims 7 and 8 have been written in independent form and incorporate several of the limitations of the currently presented Claim 3 as discussed above. Therefore, Yang does not teach or suggest all of the features of Claims 3, 7 and 8.

3. The Rejection of Claims 1, 2, 6-8, 10, 12, 17 and 18 under 35 U.S.C. § 102(e) over Yang Should Be Withdrawn

For at least the reasons discussed above, Claims 1, 2, 6-8, 10, 12, 17 and 18 are patentable over Yang and the rejection of Claims 1, 2, 6-8, 10, 12, 17 and 18 under 35 U.S.C. § 102(e) over Yang should be withdrawn.

F. **Response to Rejection of Claims 3, 4 and 11 under 35 U.S.C. § 103(a) as Being Unpatentable over Yang in View of Farrens**

The Office Action rejects Claims 3, 4 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of U.S. Patent No. 6,645,828 to Farrens *et al.* (Hereinafter “Farrens”).<sup>7</sup> This rejection is respectfully traversed with respect to the claims as currently presented.

Claims 3 and 4 claim the feature of subjecting bonding surfaces of objects to be bonded to a surface activation treatment using an energy wave “prior to performing anodic bonding of objects” (emphasis added). But, for the reasons discussed above in Section E, Yang does not teach or suggest this feature of Claims 3, 4 and 11, and, accordingly, Yang does not teach or suggest all of the features of Claims 3, 4 and 11.

Farrens does not correct the defect in the teaching of Yang. Farrens is only cited for describing “an in situ surface activation with oxygen plasma followed by an bonding process without breaking vacuum or exposing the materials to external environments,”<sup>8</sup> and therefore, cannot remedy the failure of Yang to teach or suggest the claimed feature of subjecting bonding surfaces of objects to be bonded to a surface activation treatment using an energy wave “prior to performing anodic bonding of objects” (emphasis added).

For at least the above reasons, Claims 3, 4 and 11 are patentable over the combination of Yang in view of Farrens and the rejection of Claims 3, 4 and 11 under 35 U.S.C. § 103(a) over Yang in view of Farrens should be withdrawn.

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<sup>7</sup> See Office Action, pp. 4-5.

<sup>8</sup> See Office Action, p. 5.

G. Response to Rejection of Claims 6 and 9 under 35 U.S.C. § 103(a) as Being Unpatentable over Yang in View of Katada

The Office Action rejects Claims 6 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of Katada.<sup>9</sup> This rejection is respectfully traversed with respect to the claims as currently presented.

Claims 6 and 9 depend, either directly or indirectly, from independent Claim 1. Claim 1, as currently presented, claims “performing anodic bonding of objects to be bonded after subjecting bonding surfaces of both the objects to be bonded to a surface activation treatment using an atom beam or an ion beam” (emphasis added). But Katada does not teach or suggest subjecting the bonding surfaces of two objects with a surface activation using an atom beam or an ion beam. Therefore, Katada does not teach or suggest all of the features of Claim 1, and Claim 1 is patentable over Katada for at least this reason.

In addition, for at least the reasons discussed in Section E, Yang does not teach or suggest the feature of subjecting bonding surfaces of objects to be bonded to a surface activation treatment using an energy wave “prior to performing anodic bonding of objects” (emphasis added), much less the feature of subjecting bonding surfaces of objects to be bonded to a surface activation treatment using an atom beam or an ion beam “prior to performing anodic bonding of objects” as claimed by Claim 1.

Because neither Yang nor Katana teach or suggest the feature of subjecting bonding surfaces of objects to be bonded to a surface activation treatment using an atom beam or an ion beam “prior to performing anodic bonding of objects” as claimed by Claim 1, the combination of Yang in view of Katana cannot teach or suggest this claimed feature. Therefore, Claim 1 is patentable over Yang in view of Katana for at least this reason.

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<sup>9</sup> See Office Action, pp. 4-5.

Claims 6 and 9 are dependent on Claim 1, either directly or indirectly, and, therefore, is patentable over Yang in view of Katada for at least the reasons that Claim 1 is patentable over Yang in view of Katada, and the rejection of Claims 6 and 9 under 35 U.S.C. § 103(a) over Yang in view of Katada should be withdrawn.

**H. Conclusion**

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration of this Application and the prompt allowance of at least Claims 1 through 18 as well as claims 36 through 49.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Ajay A. Jagtiani at 703-591-2664 (ext. 2001) to expedite prosecution of the application.

The Commissioner is hereby authorized by this paper to charge any fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account 10-0233-YANE-0002-US1. **This paragraph is intended to be a CONSTRUCTIVE PETITION FOR EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3) if needed.**

Respectfully submitted,

Date: June 13, 2008  
Patent Administrator  
**Jagtiani + Gutttag, LLLP**  
10363-A Democracy Lane  
Fairfax, VA 22030  
Telephone: (703) 591-2664  
Facsimile: (703) 591-5907  
CUSTOMER NO: 22506

/Ajay A. Jagtiani/Reg. No. 35,205  
Ajay A. Jagtiani  
Attorney for Applicant(s)  
Reg. No.: 35,205  
Customer No. 22506